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COAL MINING

June, 1959 Volume 36, No. 6

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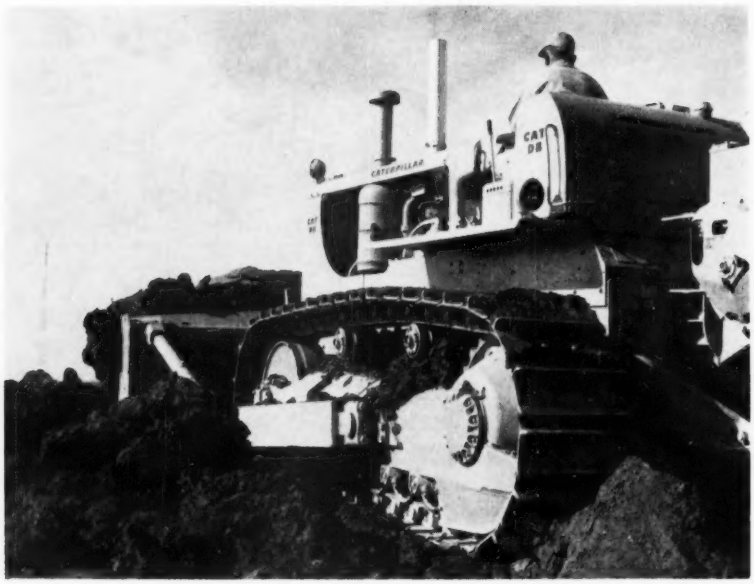

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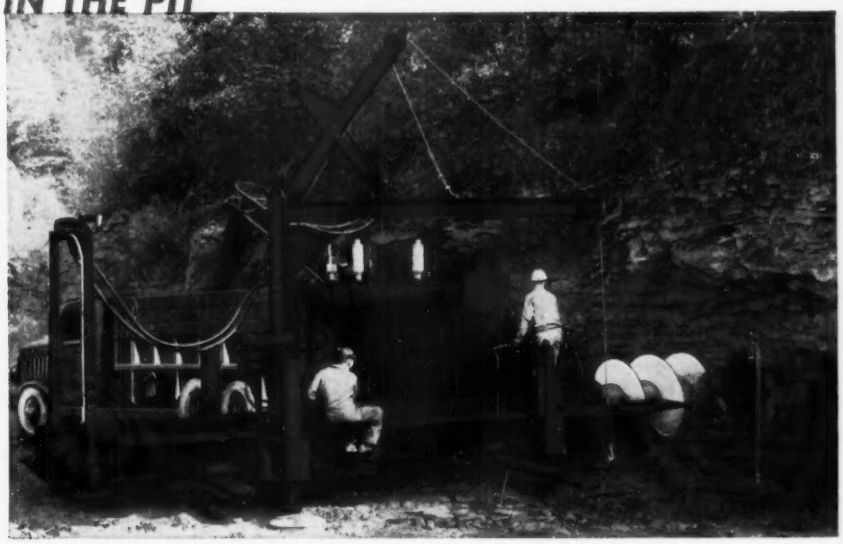
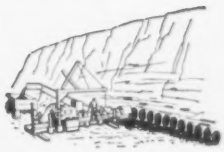
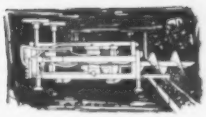
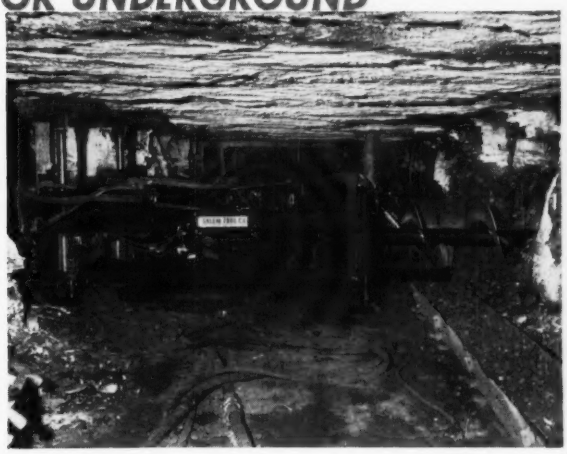




High-production, self-moving, McCarthy coal recovery drills cost less to buy and less to operate. Only a two-man crew required. No tractor needed. Augered coal costs less. See Salem Bulletin ST-59.



OR UNDERGROUND



Underground coal recovery drill has separate power unit. Turns within own length. Drills to horizontal depth of 100 feet. Five-foot augers are recovered from first hole while second hole is drilled. Just a three-man crew. See Salem Bulletin AM-59.

Compact, fast, rugged unit drives air holes, manways, storage holes and conveyor runways ten times as fast as conventional methods. Drills from −45° to straight up. Separate power unit. See Salem Bulletin UD-59.

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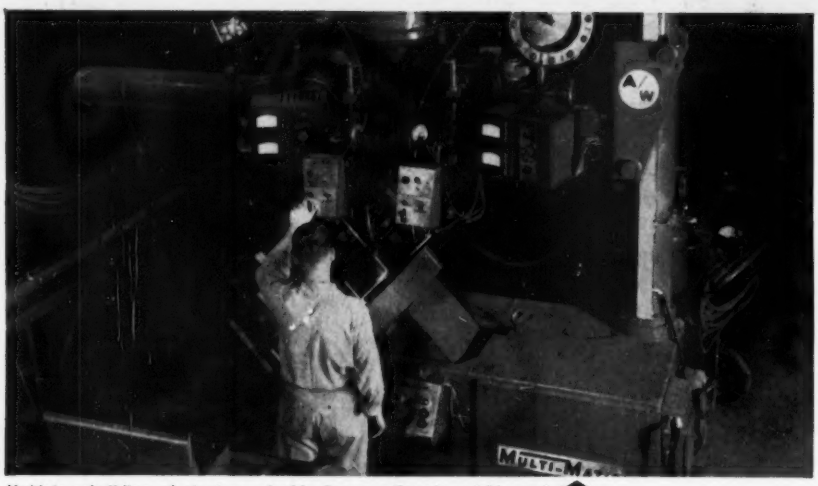
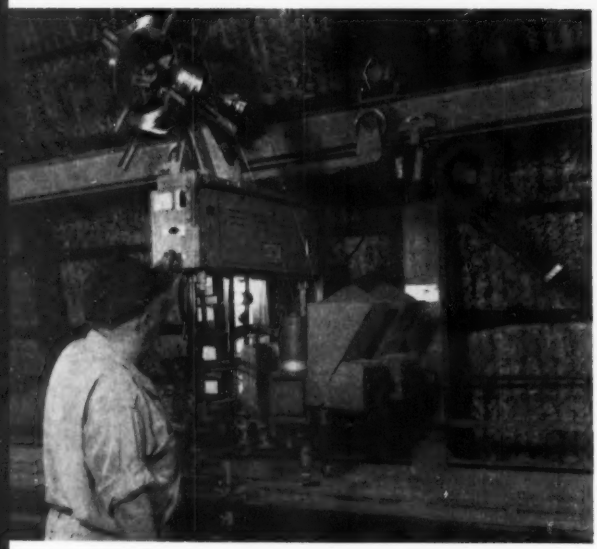
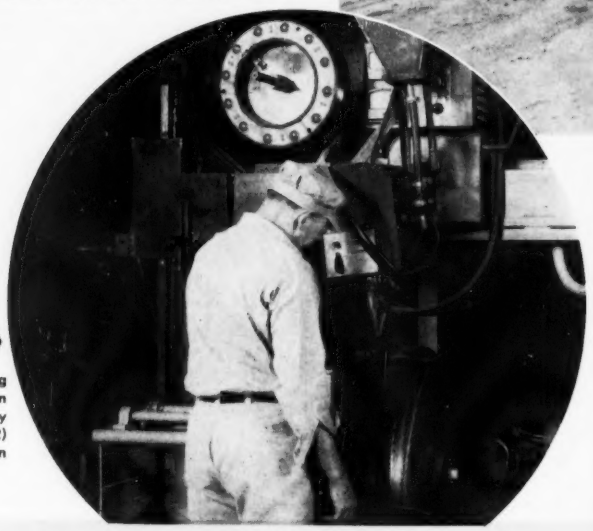
Why BECKWITH is able to rebuild BETTER and with MORE



Multiple rebuilding of single or double flange rollers is quickly and accurately accomplished with this new arc welder. Under Beckwith's "Fair-Price" Roller Exchange Plan you pay only for the cost of bringing your trade-in roller up to factory new-parts standards, based on the class of wear of your old roller. You pay a fair price instead of a flat price.



In our "Rail Reviver Plan" we thoroughly inspect your track links, replacing pins and bushings with genuine Caterpillar new parts. We then carefully align a full length of track rail on our modern welding machine and submerge the links in flux. Twin welding heads travel the full length of the track, guided by a photo-electric eye, welding both rails simultaneously and skipping the areas between links. The rebuilt rails are carefully checked out for proper build-up with special gauges which assure you of perfect uniformity of weld from start to finish.



New model submerged arc-welding machine is shown rebuilding a used idler. Our "Idler Rebuild Offer" gives you free information to determine (1) whether your idlers are worn within limits so they can still be built up with weld to make them good as new, (2) whether it is too soon to rebuild or (3) advice that they have worn beyond the most economical rebuild limits.

DANGER! There are wear limits beyond which it is not practical to go if you are considering rebuilding your running gear. There is also the danger of wasting money by rebuilding too soon. See any Beckwith field representative or check with our Service Managers to be sure that your track components are not worn beyond the point of economical rebuilding or to be certain that they actually do need build-up at this stage. We'll give you the true facts.

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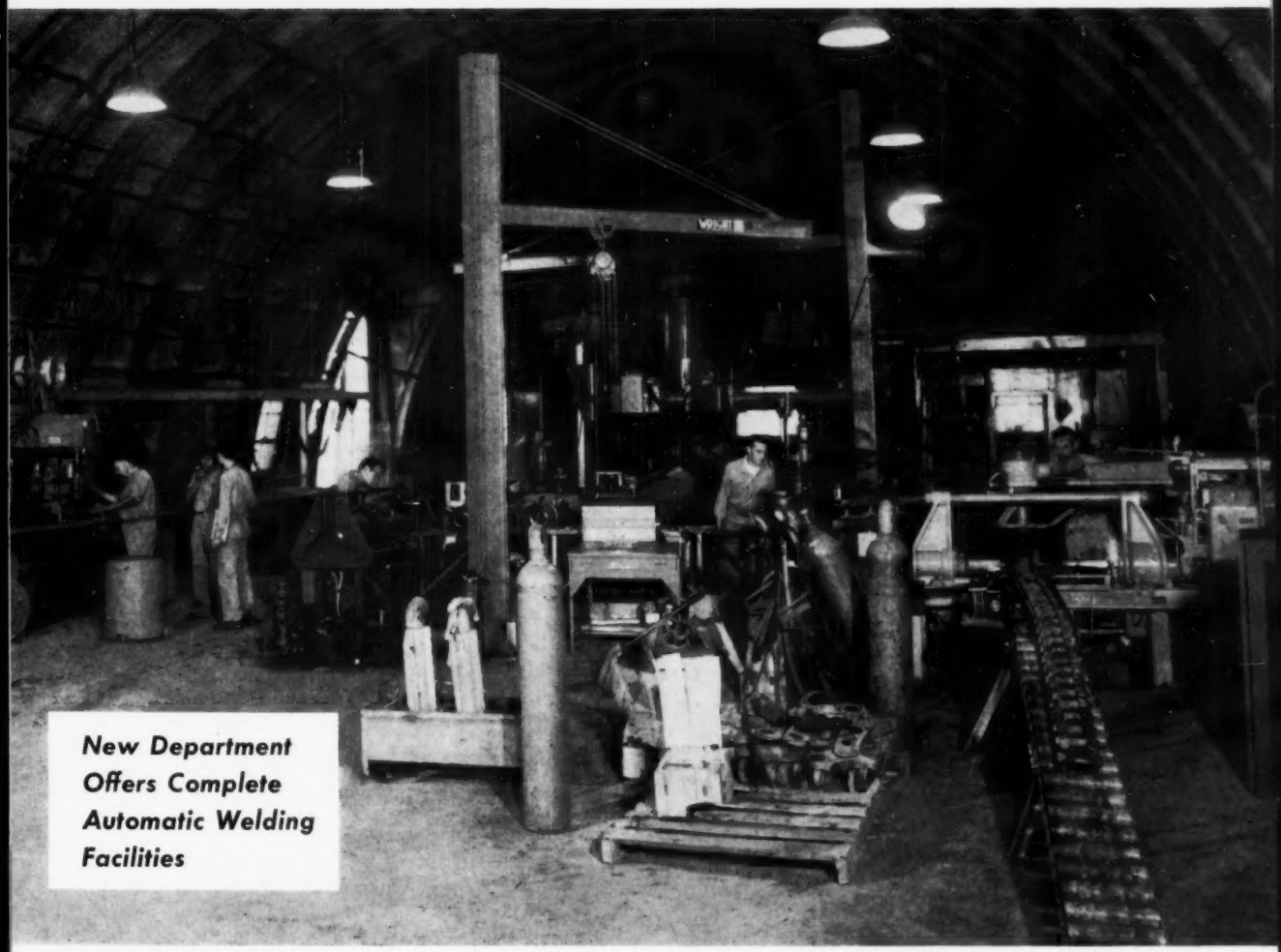
track links, rollers and idlers
SAVINGS FOR YOU . . .



New Department Offers Complete Automatic Welding Facilities

Tractor undercarriage components can now be rebuilt to their original sizes and specifications at amazingly reasonable prices. The establishment of a completely new Welding Department gives Beckwith the finest build-up facilities East of the Mississippi. Only the latest, most efficient automatic welding machinery was selected in order that we might produce the best work in the most efficient manner . . . and pass the savings on to you.

Our new facilities are manned by experts who have been specially trained in the operation of these machines so that you will receive the quality of workmanship and service which are your rightful "Bonus" as Caterpillar* machine owners.

Add thousands of hours of life to your running gear by taking advantage of our "Fair-Price Roller Exchange Program," the "Rail Reviver Plan" and Beckwith's "Idler Rebuild Offer." Our service men, parts personnel, salesmen and Equipment Service Consultants will be happy to discuss the time- and money-saving features of these various programs. Better still, we would be happy to have you inspect our new department whenever you are in the vicinity of Beckwith's Pittsburgh plant.

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● A revolutionary new off-road-hauler — heralded as the first all new truck in a quarter-century — was on display at the LeTourneau-Westinghouse Company's exhibit at the American Mining Congress Coal Show in Cleveland.

The truck, which comes in three sizes, 22 ton; 27 ton; and 32 ton; is called the "Haulpak" line. It is unusual because of its rugged simplified design. It can't break a spring, because it has no springs. Four big pistons, acting like giant shock absorbers are used instead, so it rides on air, not steel. Conventional axles have been eliminated too; its exclusive "Hydrair" suspension system makes them unnecessary. There are no tie rods or exposed steering linkage either. The entire steering system is protected within or above the frame line, giving the Haulpak twice the front end ground clearance of conventional trucks.

To make day-to-day servicing fast and simple, chassis grease fittings have been completely eliminated. Special bearings lubed and sealed at the factory need regreasing only if disassembled. Repair time is speeded up too, by easy accessiblity and quick individual removal of major components without the need for removing other elements.

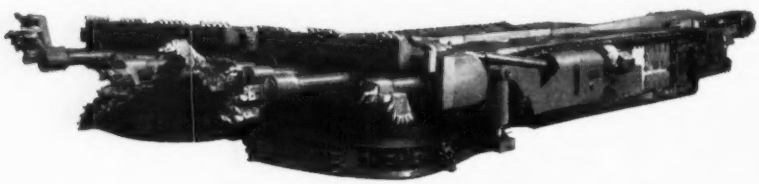
In dimension the Haulpaks are smaller than conventional trucks of comparable capacity. Its 130-inch wheelbase is a full five feet shorter than most 22-30 ton haulers. As a result, it is extremely maneuverable. It can turn completely around in a circle only 44½-feet in diameter, which is about the same as the larger passenger cars.

Powered by a Cummins 375 horsepower turbo charged engine the Haulpak Model 32 operates at speeds up to 38.8 mph through a 4-range torque converter.

Despite Haulpaks big hauling capacity, it is extremely easy to handle. Power steering, power brakes, and even a power seat are all standard equipment. For further ease of operation and driver comfort, the option list even includes cab air-conditioning.

Makes a cut 14′ 7″ wide

All the benefits of fast, efficient, continuous mining . . . in seams as low as 28 inches



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Jeffrey 86-A "Colmol" is only 25½-inches high . . . mines seams as low as 28 inches . . . gives good cleanup, smooth bottom.

Specially designed cutting and gathering chain carries coal to the center of Colmol, then up to the swinging discharge conveyor. It smooths off cusps, even when breaker-arm head is raised 8 inches for maximum mining height.

This powerful, compact Colmol advances with minimum maneuvering. Coal is broken from the face . . . not ripped or ground off. You get good overall screen consist, greater speed and efficiency. Colmol withstands the most severe mining conditions, operates with little noise or vibration.

All adjustments are hydraulic, can be made instantly and accurately. Safety features provide extra protection for both personnel and machine.

For low seams . . . or seams up to 8 feet high

Colmols step up your production rate, cut operating and maintenance costs. Write for full details. The Jeffrey Manufacturing Company, 969 North Fourth Street, Columbus 16, Ohio.

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Haulpak LW Model 80 Coal Hauler.

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COAL MINING

Vol. XXXVI June, 1959 No. 6

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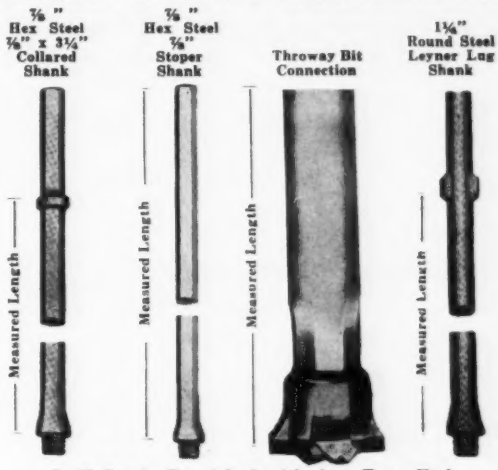
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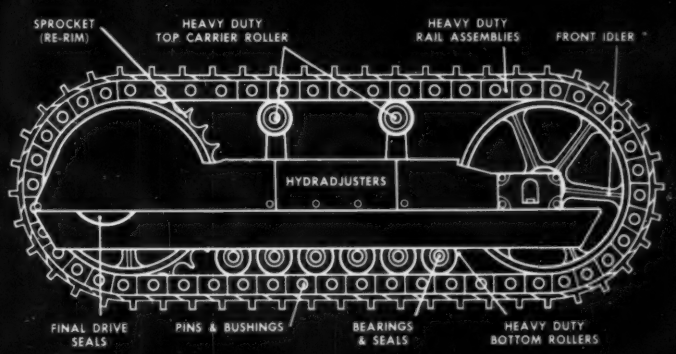

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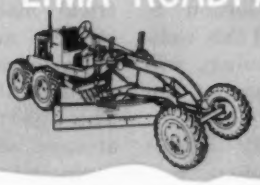

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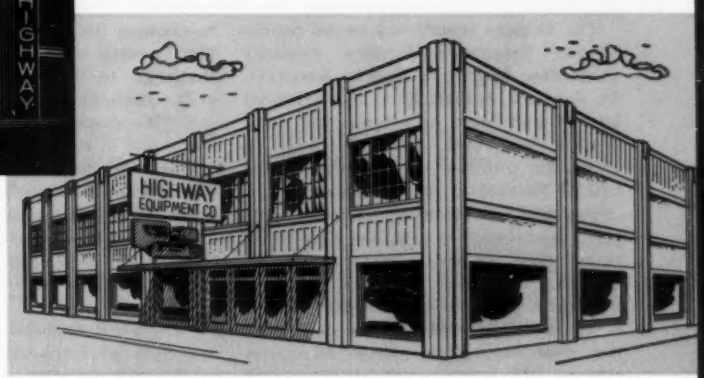

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Equipment from Highway is the finest, most modern available.

It is backed by 2 iron-clad guarantees... the manufacturers', plus Highway's own warranty of performance.

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Do You Know?

● An engineer from India has described here a new type of alternating current motor that uses direct current excitation to the stator and two-phase alternating current to the armature.

The new motor combines the smoothly adjustable speed characteristics of a direct current motor with the desirable power factor characteristics of a synchronous motor.

Prof. Paul K. Charlu, head of electrical engineering at P. S. G. College of Technology, Coimbatore, South India, told the American Institute of Electrical Engineers that the motor could also be used in single phase systems, or operated with a series and compound excitation. If additional stationary brushes are provided, it can be used as an auto-synchronized converter.

Only a small experimental machine has been tested, he said, but "it should be possible to design larger capacity machines having similar characteristics."

● President Eisenhower called for the strengthening of all education in the United States, particularly in science and engineering.

Releasing an "excellent statement" of U. S. educational goals and needs, the President stressed the importance of raising the standing of teachers in their communities.

Higher salaries are a first requirement, Mr. Eisenhower said, but the great importance of what teachers do should be recognized. They should be given the "encouragement, understanding and recognition" that will help to make the teaching profession attractive to increasing numbers of first-rate persons.

The 33-page report was issued by the 17-man President's Science Advisory Committee, headed by Special Assistant, Dr. James R. Killian, Jr. It was prepared by a 9-man panel on science and engineering education, with Dr. Lee A. DuBridge, president of California Institute of Technology, as chairman.

Doubling the current annual investment in education is probably a "minimal rather than an extravagant" goal, the scientists concluded. To reach this goal, the report made 22 recommendations.

Of all the concrete actions called for the most urgent is revision of course content and provision of teaching aids for each year of school.

The U. S. at present spends approximately $15 billion a year on formal education. Increasing this by a fraction of one percent. during a period of only a few years, would mean an increase in the efficiency of the teaching process that would yield benefits out of all proportion to the cost.

The report concluded that:

1. "Americans should attach greater value to intellectual excellence.

2. "Every school and college should re-examine its curriculum to make sure that in every aspect it is giving adequate challenge to the intellectual capacities of its students.

3. "We should do far more than we are now doing to enhance the prestige of the teacher and to provide him with more effective support in his efforts to improve the effectiveness of his teaching.

4. "We should move much further in the direction of adapting our educational programs to the widely varying competence of students.

"We should improve our scientific education at all levels, attempting to give better understanding of science to the non-scientist as well as to discover and stimulate more individuals who have the talents to become scientists and engineers."

To reach these goals, the report noted four major areas needing specific and urgent attention throughout the educational system. These are the curriculum and content courses, the quality and effectiveness of teachers, the recognition and encouragement of students, and the development of intellectual leadership. The 22 recommendations for action fell into one of these four catergories.

Included under the goal of lifting student performance to higher levels of excellence by offering greater motivation were specific recommendations for:

1. A nation-wide effort to pay more attention to the academically talented students, those in the uper 20% of their group, and to the unusually gifted students, as well as in college and graduate school.

2. Necessary help in financing the high school education of such gifted students, as well as in college and graduate school.

3. Programs of prizes and scholarships being extended into the high school level so that students even in remote and rural communities are enabled to attend high schools providing opportunities commensurate with their abilities.

4. The combining of public and private agencies to offer on a national basis a much larger number of prizes than now exist to high school students for unusual intellectual achievement in important fields.

Here and There in the Coal Industry

● Major Changes in the curriculum, to prepare electrical engineers to understand and improve devices that do not exist yet, have been made at the Massachusetts Institute of Technology.

These changes, described in the June issue of the Technology Review, have resulted in greater emphasis on fundamental scientific concepts in the engineering classrooms. This has necessitated the production of six new textbooks, and entirely new laboratory apparatus.

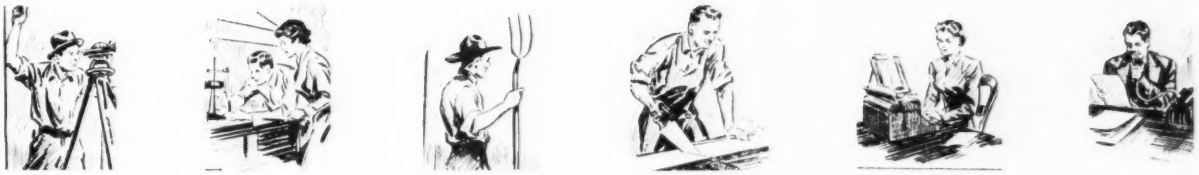
Putting this new program into effect has taken several years. One of the central courses, dealing with molecular engineering, was taught for the first time in the school year now ending. The Department of Electrical Engineering is the largest department at M. I. T., and Prof. Gordon S. Brown, who has directed this radical change in its curriculum, will become Dean of the School of Engineering on July 1.

"Members of previous classes who examine the program now may find little of what they studied in it," Profs. David C. White and Herbert H. Woodson write in The Review, "but are likely to find the faculty hopes, much of what they now wish they had studied."

The central courses, which students now take before they are permitted to specialize in various aspects of electrical engineering, were designed to broaden and deepen their knowledge of science. These courses deal with interactions between charged carriers, fields and materials, in both information-processing and energy-conversion systems, and the laboratory work was planned to stimulate creative thinking about fundamental similarities between such systems.

Profs. White and Woodson have designed a "generalized" machine for this purpose. With it, the unity underlying different kinds of electrical machines can be demonstrated, and students can study approaches to problems of electromechanical energy conversion. This particular machine has aroused so much interest among engineering educators that is soon will be introduced in the laboratories of nearly 150 other schools.

Sciences Partnership with Industry



● A partnership of science with industry existed in some degree since the beginning of man. Although it was mingled with mysticism and religious belief, primitive man's observation of orderly and regular procession of heavenly bodies was scientific discovery. Man's related timing of celestial changes to season, his planting of food and care of his livestock have early partnership of science with industry.

Important scientific discoveries are followed by industrial development on commercialization, based on new technologies. Industry's role in partnership with science is creative and practical, because discovery of new substances or new theories would be of little benefit to man unless it was made to serve his purpose.

Partnership of science with industry has increased use of employee energy from 2-horsepower at the turn of the century to 6-horsepower, while the per capita income of the employee has risen from two hundred dollars to two thousand dollars. Machinery investment per worker rose from two thousand dollars to fifteen thousand dollars. Working hours were reduced from dawn to dusk each day to 40 hours per week. Total wealth has increased from about one thousand to more than eight thousand dollars.

The unsettling result of technology in the coal industry, eminating from its fruitful use of science is insignificant compared with benefits to the industry from a competitive standpoint.

It is up to the coal industry to provide a product which is more attractive to the customer than its competitors.

The coal industry must develop machinery and methods to lower costs. Science is the most effective tool found so far to help in that effort.

J. S. Elsner, member of Engine Department Beckwith Machinery Company, Pittsburgh, Pa. Mr. Elsner is a graduate of University of Michigan and has been in the diesel engine business since 1939. He was previously affiliated with Caterpillar Tractor Co. and other diesel engine manufacturers.

When to generate your own MINE POWER

By J. S. ELSNER

Whether to buy power from an electric company or to generate your own power for a coal mine is a difficult problem to decide. Here we are going to discuss some of the advantages and disadvantages of both to help the operator investigate which procedure will be most profitable in a particular mine.

Dealing with the problem of power cost, we will consider the expense of AC power and the efficiency of **converting** AC power to DC power as compared with the cost of **generating** AC or DC power.

AC PURCHASED-POWER COST

Actually we are interested in either: (a) power-cost-per-ton of coal or (b) power-cost-per-month, but for a basis of comparison, the best figure to use is cost-per-kilowatt-hour (KWH).

Because of the many rate schedules and demand charge arrangements by the various power companies, the way to find the average cost per KWH is to add up the cost of the power for one year and divide it by the total number of KWH's consumed for that period. The answer is your cost per KWH.

If your mine is **completely powered** with **AC** motors and this figure . . . average cost per KWH . . . is **below 3.5** cents with 100 KW demand, operating 10 hours per day for 200 days per year, you may as well stop reading right now. In the following calculations you will see that with 14 cents per gallon fuel oil it will cost approximately 3.34 cents per KWH to generate your own power. This figure can be low or high. Obviously in such cases it is more economical to generate your own power. However, one power company figures an average cost of 4.2 cents per KWH for mine power in rural areas.

COST OF DC POWER

Because of the inefficiency of transmitting DC power, it is necessary to convert AC to DC power at the mine, if the mine machinery is driven by DC motors. There are many types of converters for producing DC power with varying efficiencies.

Tonnage costs have been reduced and power requirements have increased with additional mechanization of even the smaller mines.

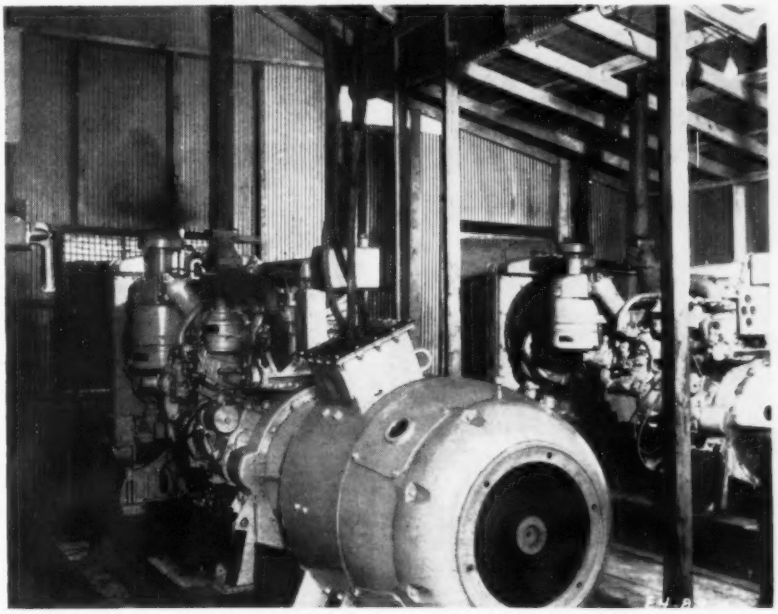
The oldest and least efficient is probably the motor-generator set Because of poor efficiency at partial loads and high power consumption at no load (at zero amps on the DC output, the AC motor can be using as much as 25% of the full load rating) the cost of producing DC power is much higher than most people realize.

The figure 60% is a good overall efficiency for converting AC to DC. If AC power is only costing 3 cents per KWH, DC power from an MG set will cost 5 cents per KWH or . . . 4.2 cent AC power is 7 cent DC power as it enters the mine. This figure of 60% efficiency for an MG set is actually on the high side. One large steel mill figures it costs them 180% of their AC power cost to furnish DC power. This represents an efficiency of 55.5% and, being in a large scale operation, has the advantage of most favorable performance.

Rectifier, a more recent type of electrical source for DC power, are far more economical because they have a better overall efficiency . . . usually figured at about 80% to 85%. No-load current draw is only about 2 to 3% of full load requirements. Here 3 cent AC power would be 3.75 cents as DC power; 4.2 cent AC power would be 5.25 cents DC power, all based upon the 80% average overall efficiency.

COST OF GENERATING POWER

To figure the cost of generating power, we will chose as an example, a small mine that has machinery which can be handled with a 100 KW Diesel Engine Generator Set. For best efficiency we are selecting a set to run at 1200 RPM. It will operate at about 60% of rated load. From the 1200 RPM curve on Figure 1 at 60 KW we read 5.6 gallons per hour. Because this is an average load, we will add about 10% to the figure for an estimated fuel consumption of 6.2 gallons per hour for variable load. We will base the use of the generator set on 200 ten hour days per year. This represents a total of 2,000 hours per year and a production of 120,000 KWH per year.



Two 100 KW 250 volt DC 1200 RPM generator sets operating in parallel furnished power for underground mining operations powering loader, cutting machine, two shuttle cars, supply wagon, 2200 ft. of conveyor belt and loading tipple.

The engine-, generator and switchgear in place will cost about $12,700.00.

Fuel cost per hr. 6.2x14c	**$ .868**
Lube oil and filter cost— Lube oil $1.10 per gal., 250 hours between change, plus makeup oil	**.150**
Interest and depreciation —First cost $12,700 — 6% interest —Average cost per hour, 10 year basis	**.847**
Maintenance Cost	**.140**
Total cost per hour	**2.005**

Cost per KWH on an average of 60 KWH load for a 100 KW generator set. $\frac{2.005}{60} =$ **3.34c**

Larger sets and higher percentage of load do bring the operating cost down to 2.7 cents in some operations.

It should be noted that depreciation and interest on the investment account for about 42% of the cost for generating power. This was not considered when we figured cost of DC power from the MG set or the rectifier. Used MG sets today are quite inexpensive so that depreciation and interest on the investment are low. But maintenance costs can be high.

A new 100 KW rectifier will cost approximately $8,500.00. To figure depreciation and interest on the investment based upon 20 years and the same 60 KW average load would add .68 cents per KWH with no maintenance or repair costs figured.

Therefore, to get a better picture of DC power cost to the mine when purchased AC power is used. the following formula is suggested for 100 KW size.

$$\frac{\text{Average AC cost/KWH}}{80} + .68 \text{ cents} = \text{Cost/KWH.}$$

Working this formula back from the 3.34 cents per KWH, (the cost to generate DC power), we come up with an average AC power cost figure of 2.096 cents as the equivalent figure for AC power, if your cost of generating power is to be 3.34 cents. While there would be some maintenance cost for a rectifier, it is low and shouldn't be much of a factor in this discussion.

TOPSIDE POWER

Driving fans, crushers, conveyors, etc. topside can all be handled with AC power. If AC power is too high-

priced due to the location, then an engine furnishing both mechanical and electric power should be investigated.

It is less expensive to drive a unit requiring a large amount of power mechanically than to drive it electrically. A V-belt drive can be up to 95% efficient. However, the generation of electrical power and then transmission to mechanical power from a motor, has an overall efficiency of 75 to 78%.

In comparison with the 3.34 cents for electric power, mechanical power would be in the neighborhood of 2.2 cents, due to greater efficiency and lower initial investment. A good way to handle the power requirements topside is to employ an engine mechanically driving the largest unit such as a fan or crusher. For the smaller motors and lights, a small generator driven from the same engine can also be used. This will give you the economy of mechanical drive plus the flexibility of electric power.

SAFETY DEVICES

Diesel engines can be operated very satisfactorily today without constant attendance because of the availability of various safety devices. The most complete is a set of alarms and a shutdown control. First the alarms would ring in event of low oil pressure and/or high engine jacket water temperature. If such be the case, the topside man would probably be alerted by the alarm and could possibly correct the probem without even shutting the engine down. If, for some reason, the alarm was not answered, then the automatic controls would take effect and shut down the engine to protect it from additional damage.

Of course, it is always good to have an alarm in the air flow stream to check the performance of the mine fan.

GET YOUR OWN FIGURES —

Many figures have been used in this discussion to illustrate points, but none of these figures could apply exactly to your situation. If you plan on opening a new mine, first get the rates from the power company. Compare the rates, equipment powered or to be powered, tonnage, etc., with a nearby mine to try to see what your power consumption will be and what your KW hour cost will be. Then check this cost against generated power Don't use the figures presented herein on generated power cost, either. Due to your particular operation these figures might be very unrealistic. (By getting better power utilization from a 150 or 200 KW generator set in a larger mine, your generating figure can drop as low as 2¾ cents using diesel power and about 2¼ cents with a natural gas engine where natural gas fuel is low priced.)

FOR ECONOMICAL POWER COSTS

You will note that most of our calculations have been based upon one 10 hour day. If you operate two shifts, the depreciation costs will be greatly reduced. Depreciation is shown at 42% of the cost per KW hour. By adding another shift this could be cut in half and result in 21% reduction in cost . . . bringing the power price down to 2.64c/KW hour. Actually the one shift 200 days per year (2000 hours per year or 20,000 hours per 10 years) represents only a small portion of the total "work life" for a medium speed Diesel engine. It is not uncommon for an engine in this application to run 20,000 hours with only minor servicing. 40,000 hours for two 10 hour shifts per day for 10 years is still not unusual life for a generator set. The $5,600.00 (14c per hour for 40,000 hours) would easily cover the maintenance costs, including a good preventative maintenance program.

This is why it is necessary to figure the operating costs for your particular power requirements!

To keep purchased-power bills down there are a number of items which can be summarized:

1. Select machinery that will keep the demand charges down. Machinery that imposes a continuous load will have a lower demand than heavy loads for shorter duration. For example, conveyors transport coal at lower power cost than mine locomotives and cars.

2. Rectifiers are considered more efficient and reduce demand and kilowatt hour consumption.

3. Operating with less power for longer periods is cheaper than using a lot of power for short periods.

Some of the above points are also valuable to keep in mind when generating your own power, as it may be possible to reduce the size of the generator set needed.

Selection of a diesel engine to drive a generator also calls for some close inspection of the product. A complete investigation of the merits of competing engines should take into consideration the following:

1. **Fuel consumption at partial loads, ie, 100% load, 75% load, 50% load and 25% load. The fuel consumption at the 50% and 75% marks are often more important than the 100% mark because the unit will be operating at the lower points far more often than the 100% mark.**
2. **Keep operating speed of engine down. Maintenance and fuel costs are lower for the slower speed engine. Figure 1 (Chart) shows the fuel consumption of two 100 KW generator sets built by the same company. One at 1800 RPM and one at 1200 RPM. You can see a saving of over 10% from the 1200 RPM machine.**
3. **Check cost of repair parts. Some manufacturers with small production sell their units at low price and have very high cost for replacement parts.**
4. **Check availability of service. Although you may be a top mechanic personally, you may have to bring in factory-trained servicemen sometime. Purchase a unit that is backed by a good parts and service organization conveniently located.**

In determining whether to use purchased power in your mine's operation . . . or to generate through

(Continued on Page 17)

MOVE DIRT 10-20% FASTER ... HAUL 8% GREATER LOADS ...

NEW CAT DW20-DW21 SERIES G TRACTORS AND MATCHING LOWBOWL SCRAPERS

DW20-DW21 SERIES G TRACTORS 345 HP —

pay off with faster cycles.

CATERPILLAR'S
PROJECT PAYDIRT

Project Paydirt, a multimillion-dollar research and development program to meet the continuing challenge of the greatest construction era in history with the most productive earth-moving machines ever developed.

Big changes on the Cat DW20 and DW21 Tractors pay off for you *on the job* with faster cycles, greater production and more profits!

• *Now* the big wheel tractors develop 345 HP—an increase of 8% over former units • Both tractors have 12% more rimpull than before—the DW20 develops 39,565 lb. (maximum) rimpull, and the DW21 has 49,100 lb. (maximum) rimpull • As a result of this increased rimpull, the new rigs travel faster (up to 20%) under similar haul road conditions • Extra ply rating tires are now standard. Tires are now 29.5–29, 28 ply rating for increased tire load capacity. Optional ply ratings and sizes also available • To match this greater power and capacity, improvements have also been made in the transmission and final drive.

Dry-type air cleaners, air brakes and Cat Torsionflex seat are standard equipment. Front wheel power-boosted steering is also standard on the DW20.

So, now—more than ever before—it's smart business to choose big Cat wheel Tractors! Put these heavy-duty two and four wheel rigs on your job—and watch them move more dirt faster and at lower cost than anything else of similar size! Get all the facts from your Caterpillar Dealer. Call us today!

IMPORTANT INFORMATION ABOUT

19.5 CU.YD. LOWBOWL SCRAPERS

. greater production!

New No. 456 and No. 470 Series B LOWBOWL Scrapers match the increased horsepower and productivity of new Series G wheel tractors. They incorporate many new features —while retaining job and profit-proved LOWBOWL design. • Ratings are increased 8% to 19.5 cu. yd. struck and 27 cu. yd. heaped • Bowl, draft frame and apron are strengthened for greater resistance to tough materials and rugged loading • New push-frame assembly withstands higher loading stresses —even tandem pushing.

Every LOWBOWL component from cutting edge to push block is engineered to load material faster and easier.

All these—and many other improvements—result in better performance, lower cost dirt and longer service life.

Plan your spread around these new, big Cat wheel Tractors and matched equipment—and you'll stay on top of your production schedule! Let us help you!

24 CU.YD. CAT NO. 482 LOWBOWL SCRAPER

Now there are two scrapers for use with Cat DW20 Tractors—the No. 456, and the big No. 482. You decide the one you need to match your job conditions. The No. 482 hauls 24 cu. yd. struck, or 34 cu. yd. heaped. Load capacity is 72,000 lb. It has LOWBOWL design for faster, void-free loading.

THE CAT D9 TRACTOR ON THE FOLLOWING PAGE ➡

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2807 Reynolds Road, TOLEDO — OHIO
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CM-8V

D9 THE MOST PRODUCTIVE *Tractor–Pusher Dozer–Ripper* EVER BUILT!

Here's the *one big tractor* more contractors pick for the really tough jobs. It's powered by the world's mightiest turbocharged crawler engine designed specifically for the D9. The Caterpillar D9 Tractor offers you choice of two time-proved transmissions—a three-stage torque converter, or a direct-drive transmission with exclusive Cat-built oil clutch.

Tried and proved in a wide range of applications, the D9 has earned its hard work reputation as the top producing crawler . . . the giant of the earthmovers.

D9 and No. 9 Ripper speed and economy extend ripping application to materials formerly requiring drilling and blasting. Here's controlled power for ripping rough, tough materials.

See the D9 at our headquarters—the pacesetter of the big-tractor class. Let us show you how it can pay off for you!

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CATERPILLAR

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DM-1696

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PARTIAL LOAD FUEL CONSUMPTION CURVES OF THE 100 KW GENERATOR SETS ONE AT 1200 RPM AND ONE AT 1800 RPM.

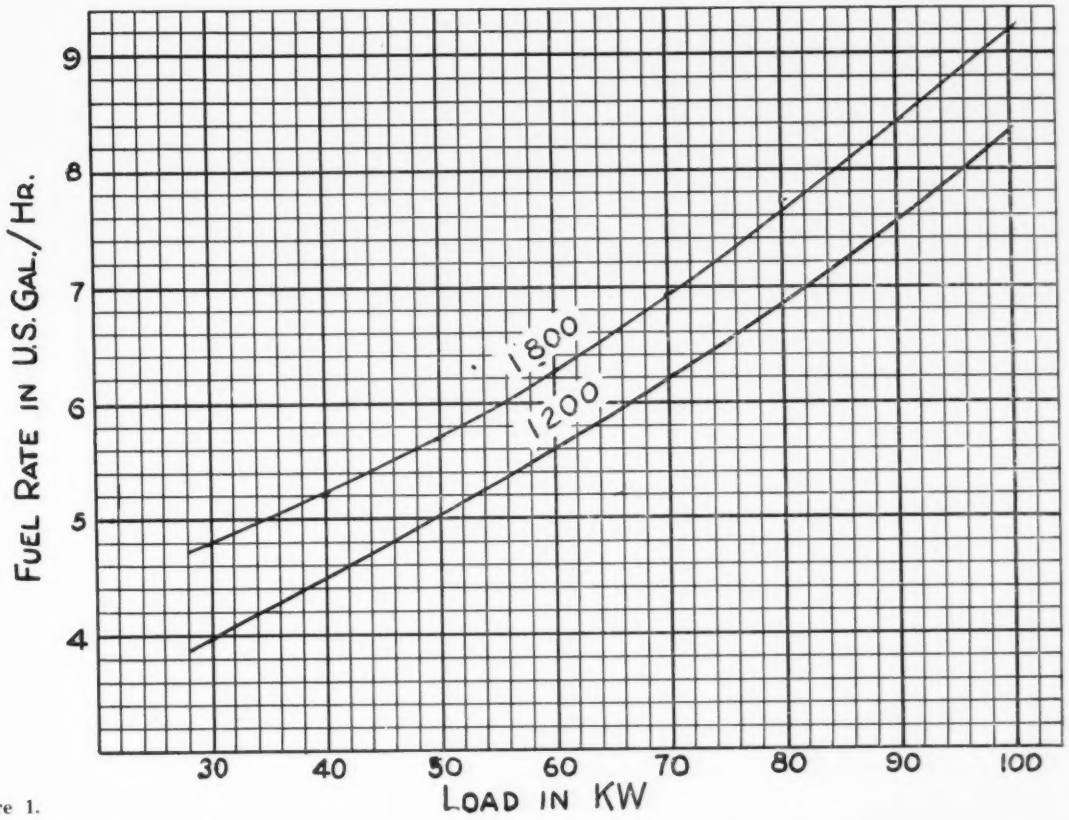


Figure 1.

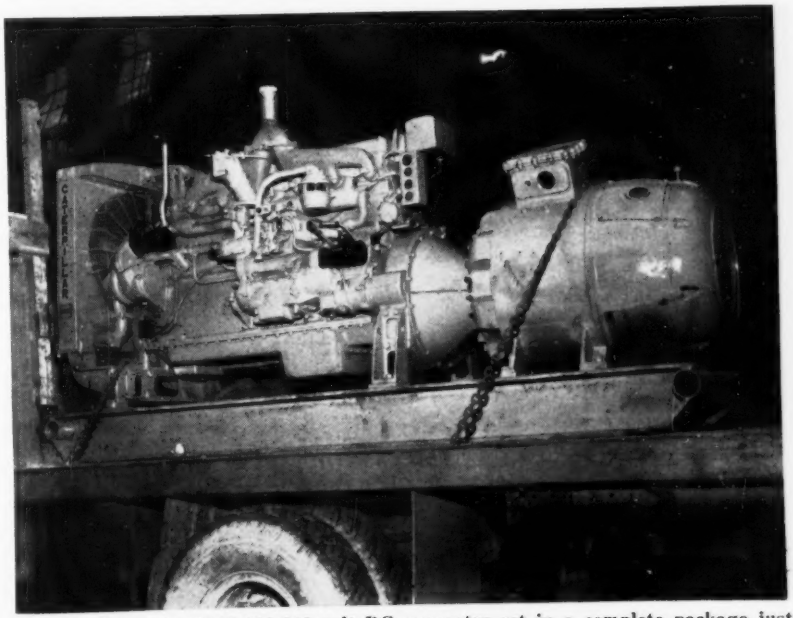
(Continued from Page 12)

diesel engine, one should consider not only comparative KW costs but other factors as well.

Cost of bringing A. C. power from the nearest source to the mine site is important. If long runs of line, pole installations and costly transformers are required, it may be less expensive to purchase a diesel-generator set. Demand charges should be thoroughly investigated, since the possibility of infrequent operation or mine shut-down could result in continued charges without actual use of power.

Another major feature of self-generated power is the portability of the diesel-electric set. Inexpensive movement from mine location to location can be made.

Profitable mine operation depends upon good management. Good Management will study carefully all the aspects of getting power to the mine most economically.



One 100 KW 1200 RPM 250-300 volt DC generator set in a complete package just prior to delivery to deep mine.

From Mine to Customer...

Two-Way Radio Coordinates River King Activities

● The sight of the long whip or shorter VHF antenna mounted on vehicles of all types is no longer strange in this country's surface coal mines. One mining company that has taken to two-way radio in a very big way is Peabody Coal Company, St. Louis. As the second largest commercial producer in the country, Peabody is currently operating 24 mines. Of these, only three small or captive mines are without radio.

The most extensive radio operation is at Peabody's River King mine, Freeburg, Illinois. Here, modern communications accompany the coal from mine to preparation plant; from here to river dock via the company's railroad; and up or down the Mississippi on subsidiary Mid-American Transportation Company barges.

The initial radio installation at River King was in the mine itself, shortly after it was opened two years ago.

A 60 watt base station, located in a weatherproof outdoor cabinet at the foot of a 120 foot self-supporting antenna tower, is controlled from the mine office. Another 60 watt station is in the mine shop four and a half miles from the office. Eleven mobile units are included in this system. These are installed on vehicles used by three pit foremen, the mine superintendent, his assistant, the drilling foreman, the electrician, and electrician's helper. The supply truck, and a new dragline are also radio equipped. Last, but certainly not least, there is a 2-way radio installed on River King's Marion type 5760 shovel, a 70 cubic yard electric excavating machine.

Radio system base station can be controlled from this remote console in the main office as well as from a similar console in the preparation plant.

The reason for radio on this 6,000 ton piece of equipment is quite evident. With the heavy investment involved, Peabody officials know that every minute costs money whether the equipment is productive or not. Hence, non-productive time must be minimized since fixed depreciation costs plus variable operating costs and salaries march on. The shovel's crew consists of the operator, an oiler and a tractor operator. Should anything go wrong that can't be taken care of immediately by one of these three men, the fastest recourse is a radio call to the electrician or to a mechanic at the shop. Should this man find the trouble more involved, the radio again is used to call the mine office, asking that the manufacturer's service department be called.

It isn't only in the emergency situations that the big shovel's radio is used. Routinely, the electrician is called very often to coordinate cable changing. Again, the use of radio speeds this operation and so cuts down on unproductive time.

Each morning the shovel's radio is used to order necessary supplies for the day.

The radio unit in the drag line is used in the same way as that in the big shovel.

While these benefits brought by radio in the very large pieces of equipment are evident, those in the other vehicles are just as important. The foreman and superintendents would be line a businessman in a telephone-less office if they did not have two-way radio in their automobiles and pickup trucks. Since the bulk of heavy equipment is electrical, the electricians must be reachable at all times. Without radio, this would be very difficult since a man can get lost very easily in a 10 square mile mine.

River King Assistant Superintendent Bob Kelce says the unit in the supply truck is especially helpful, since this vehicle is very often sent to Belleville, Ill., for needed parts or other supplies. Since the base station range encompasses Belleville, it is very easy to contact the driver if it is discovered something else is needed. This saves a second trip.

The entire River King System was furnished by Motorola, as was almost all the rest of the Peabody radio equipment. The system, like the majority of Peabody networks, operates on a frequency of 154.49 Mc.

Communications supervisor Dave Kelce say the use of a single frequency throughout the Peabody systems make it easy to transfer equipment from mine to mine. He pointed out that this is especially important when a mine is depleted. Then the radio equipment can be transferred to other systems with no need for changing frequency. Although several of the mines are close enough for base-to-base communications, this is not necessary, says Kelce, since each mine is a self-contained unit.

At River King, the use of radio does not end with the actual mining of the coal. After the coal is run through the preparation plant, it is transported by the company's Peabody Short Line Railroad to either the company's Mississippi River dock in East St. Louis or transferred to a trunk railroad in Bellevile or East St. Louis, Ill. The Peabody Short Line this year installed its own two-way radio system. Operating on the same frequency as the mine system, the railroad network consists of railroad radio units in the line's three diesel locomotives and a regular mobile unit in the vehicle used by Tony Shimkus, the Short Line's General Manager. The system also includes a base station located at the railroad's dispatcher's office. The entire network permits communications between engine crews, between the preparation plant or mine office and the engines; or between the dispatcher's office and the engines.

Shimkus says the railroad system used in conjunction with that at the mine, was installed for two main purposes:

During emergencies or breakdowns, the railroad crew is able to radio for assistance immediately, instead of spending valuable time walking to a wayside phone. Since the crews must move a certain amount of coal each day, down time must be kept to a minmum to eliminate any danger of a bottleneck.

During routine operations, the ability to communicate from the preparation plant to the engines enables coordination of car loading and movement in the sidings near the plant.

At times, the Peabody trains are delayed 15-20 minutes when obtaining clearance to cross the tracks of the Illinois Central. Radio, permitting close communications between the engines and the dispatcher eliminates this.

Once, at the Peabody dock in East St. Louis, the coal is loaded on barges owned or leased by Mid-America

Two-way radio is extremely important in River King Mine in keeping the Marion Type 5760 shovel in constant operation. Electricians and mechanics can be contacted immediately to keep down time to a minimum.

Transportation Company, a subsidiary of Peabody Coal. This transportation firm operates almost 100 barges and five towboats.

The modern towboats, one of which was christened in autumn of 1958, are equipped with radio telephones and radar systems. In addition, Mid-America operates a VHF mobile system. Each of the towboats is equipped with a Motorola 100 watt Compa-Station radio unit specially fitted for use on tugs or towboats. Two automobiles, use by Captain Noble Gordon, president; and Thomas Kirkpatrick, operations manager, are also part of the system. This particular type of system enables communications from the automobiles to the towboats anywhere along the river. While equipped with regular radio telephone the boats cannot communicate with the shore unless they are within range of the telephone base stations. Since Kirkpatrick is stationed at Paducah, Kentucky, where there is no telephone base station, he is unable to communicate with the boats. With the private two-way system, Kirkpatrick can talk with the boats anywhere within 50-60 miles of Paducah. Since the towboats serve loading docks in the Paducah vicinity, this ability is very important to coordinate boat and barge traffic and to make sure necessary supplies are on the dock when the boat arrives.

Making full use of time and equipment in all stages of a mining operation, up to and including transportation, is most important if operation is to return a profit. Peabody Coal has found that two-way radio is just one more way of eliminating as much unproductive time as possible.

Operator of 70 cubic yard electrical shovel has radio control at his finger tips in equipment control rooms.

● Millions of Americans are growing fat and starving themselves at the same time.

Poor nutrition prevails to a disturbing degree in the United States and is generally misunderstood, ill-defined and ignored, two Evansville, Ind., pysicians told colleagues at the clinical meeting of the American Medical Association. The doctors, Harold D. Lynch and W. D. Snively, Jr., charged that everyone considers himself to be a nutrition expert.

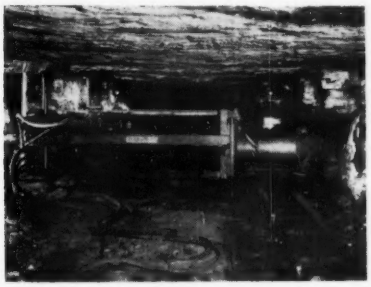
They urged the nation's family doctors to push aside the "fads, fancies and fetishes of the laity," and tackle the problems from the standpoint of clinical medicine.

Routine examination of school children shows that poor health and poor nutrition are at least as common in the prosperous school districts as in the poorer neighborhoods. Malnutrition is not necessarily depicted by the skinny, scrawny, tattered individual, a product of the slum area. Many persons simply starve their bodies of food they need while growing fat on food they do not need, the doctors pointed out.

There is an abundance of protein-containing food in the U.S. We have plentiful supplies of fowl, meat, milk, eggs, cheese and cereals, as well as vitamins and minerals. Our children are carefully provided with minerals and vitamins while the master nutrient, protein, is neglected, Dr. Lynch said.

Children, in particular, pose a difficult problem because feeding deteriorates into a selling job as infants grow. Mothers give the child whatever they can and whenever it suits the fancy of the child.

For instance, beverages, including milk and juices, can be poured down fairly easily. But protein foods require chewing, a task which many youngsters are reluctant to perform. In addition, protein foods are not sweet. On the other hand, desserts, sweets, and palatable between-meal snacks readily win the younger child's approval. Older children and adolescents need after school and bedtime snacks that include carefully selected protein foods.



● A new line of underground coal recovery drills capable of handling augers from 24″ to 44″ in diameter and 5 feet in length has been announced by the Salem Tool Company, Salem, Ohio. The drill and its separate power unit are self-moving on skids and jacks. It is producing as much as 40 tons per man-shift.

The drilling unit for 34″ augers is 7′ 10″ wide; 48″ high and 11′ 3″ long. The cutting head resolves at 33.75 RPM with a forward speed of 6 feet per minute. It is capable of drilling as far as 100 feet.

The separate power unit is connected to the drill with 50-foot hydraulic hoses. It is equipped with two 50 HP motors and is available AC or DC. The power unit is 6′ 6″ wide; 42″ and 8′ 8″ long.

In operation the first string of augers is recovered and reused as the second hole is drilled. The recovered augers slide into a cradle ready for use. Just two men are needed on the drill. A third man operates the power unit, conveyor and in some instances spot cars. Drilled coal feeds directly from the auger to the drill's own conveyor.

The new unit permits low-cost recovery of otherwise lost coal. In old workings minimum preparation is required prior to augering. In new workings the drill adapts to use with other production equipment for selective mining. The unit permits coal to be taken without disturbing weak roofs.

Write for Salem Bulletin AM-59. It gives complete specifications and shows the drill at work in the mine.

● Available to owners of diesel and gas engines is a new "Log Book" offered by Ohio Machinery Co. Suitable for most sizes and makes of engines, the book records thirteen months of operation and contains space for daily entries on fuel and lube oil consumption, parts, service, repairs, etc. Monthly entries may be transferred to a twelve month summary sheet. A post card is enclosed with which the operator can order a new book when the old one is used.

This book is bound in smudge-proof covers. For your copy write to Department I, Ohio Machinery Co., 6606 Schaaf Road, Cleveland 9, Ohio asking for "Engine Log Book."

● Appointment of L. G. "Lou" Lenz as used equipment manager, Highway Equipment Company, Pittsburgh and DuBois, Pa., is announced by D. L. Reynolds, president.

L. G. Lenz

Mr. Lenz was formerly Highway's district representative in the Clearfield, Pa. area for 12 years. He will be in charge of the repair, rebuilding and sale of all used machinery handled by Highway, which is one of the world's largest equipment distributors. Its major lines include Allis-Chalmers, Jaeger, Gar Wood, Tractomotive, Master, Thor, Lima, Heltzel, Rogers Trailers, Buffalo-Springfield and M-R-S.

Used units, sold by Highway, carry full warrantees covering both parts and labor. They are offered under 3 separate guarantees, A-1, A-2 and A-3 for 30-60-90 day periods, depending upon the style of machine selected.

● Library machines that will not only find references, but read the books for you and teach you from their contents were foreseen at the Western Joint Computer Conference in San Francisco.

At this meetng with the theme "New Horizons in Computer Technology," attended by leading computer experts from all over the country, Calvin N. Mooers, inventor, and proprietor of Zator Company, Cambridge, Mass., predicted that in the next 20 years library machines for specialized collections will begin to take over more and more of the jobs now performed by human cataloguers and researchers.

Information retrieval machines competent to handle collections of millions of documents will be available in the near future, the scientist said. However, the use of such larger-scale machines will simply make worse what is now our biggest bottleneck in information retrieval. This bottleneck is the use of human beings to assign subject headings or descriptors to the torrent of documents pouring into any large library.

Because it is a human bottleneck, this task should, and can, be turned over to machines, according to Mr. Mooers. He expects this to be one of the first of his predictions to come true. Using machines to analyze documents and assign descriptors is not unlike using machines to write automatic abstracts, as has been reported by H. P. Luhn of International Business Machines, Mr. Mooers said.

Assigning descriptors to text is also a very simple kind of language translation, he said. It may be that this rudimentary form of translation will be perfected long before machines are able to produce good idiomatic translations from one natural language to another.

Machines will talk back to the human being who comes to the library to look for information, Mr. Mooers predicted. Such back talk will tell the user what is available, help him use the classification system, and assist him in making better use of the library machine and the library. The best information retrieval systems of today, whether or not they use machines, already do this in a primative fashion, Mr. Mooers said.

J. J. Janssen, Sr.
sales manager ▶

Highway Equipment Company Names New Representatives

● J. J. Janssen, general sales manager, Highway Equipment Company, Pittsburgh and Du Bois, announces five new sales department appointments.

New industrial sales manager is William R. McCloskey who will make his headquarters at Highway's Pittsburgh plant, 6465 Hamilton Ave. Formerly affiliated with Stone & Webster Engineering Corp., both in the U. S. and abroad, Mr. McCloskey possesses extensive experience in the welding and general construction fields. For the past ten years he has specialized in industrial material handling problems. He is a charter member of Material Handling Society, Pittsburgh branch.

William R. McCloskey

J. Thomas Benbow, 814 West 33rd St., Erie, is the new representative in Mercer, Crawford and Erie counties. An alumnus of Guilford College, he was formerly associated with A. T. Green Machinery Co., Pittsburgh. He is a Marine Corps veteran of World War II and the Korean campaign.

Representing Highway in Washington, Fayette and Greene counties in Pennsylvania and in the West Virginia Panhandle area is Walter A. Gaspar. His experience includes service with Anderson Equipment Co. and Watson Equipment Co., Pittsburgh. A University of Pittsburgh alumnus, he was in the Navy Air Corps in World War II. He will be located at Highway's Pittsburgh office.

David K. Swank will represent Highway in Clearfield County and make his headquarters at Highway's Du Bois branch, 40 Hoover Ave. For the past five years he has been affiliated with Clearfield Equipment Co. Previously he was associated with Kennedy Farm Equipment Co., Wheeling, and L. L. Hepler Implement Co., Tarentum. A Veteran of the U. S. Air Force in World War II, he attended Process Metallurgy School, New Kensington.

Lawrence A. Toomey is the new sales representative in northern and southwestern Allegheny County. He was formerly affiliated with Atlas Equipment Co., Pittsburgh, and A. T. Green Machinery Co. A World War II Army veteran, he attended Duquesne University.

J. Thomas Benbow

Walter A. Gasper

David K. Swank

Lawrence A. Toomey

● 3 new and improved models of its Type 8 Rotary Drill are announced by Davey Compressor Co., Kent, Ohio.

Model M-8A is a rotary blast unit, designed for mounting on any standard truck. It has rated capacity in excess of 1500 ft., using 2⅞-inch API drill pipe. Power for its operation may be drawn from the truck engine through a Davey heavy-duty power take-off. Or it may be operated by a separate gasoline or diesel power unit.

Compressor for "air blast" drilling is a Davey 500 c.f.m. machine. This is said to supply ample air for hole cleaning and maximum drilling speed.

Davey Model M-8A Rotary Drill.

The drill mast has 25,000 lbs. working capacity. It accomodates an 18½ ft. kelly and 15 ft. drill pipe. Pull-down is chain operated of the hydraulic-automatic type. Draw works are 2-drum, in line, with capacity of 10,000 lbs. each. Rotary table has a full 8-inch opening. Weight of the complete M-8A rig, less truck chassis, is 20,000 lbs.

The new M-8AL model is similar to the M-8A. However, it is equipped with a special long kelly and mast. It can drill 24 ft. ledges without changing steels. Rig weight is 26,000 lbs.

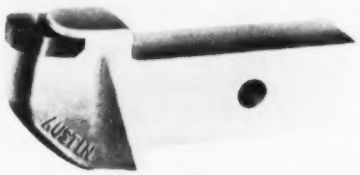
Model M-8MA is a combination air blast and mud rotary rig. In addition to the regular M-8A features, it is equipped with one of several types of mud pumps, available to match job requirements. Change from mud to air blast drilling is accomplished by shut-off and by-pass valves. These eliminate need for re-assembling the pressure line and enable the operator to change over in minimum time.

Rated capacity lists normal performance with air blast and 6-inch drill bit as 600 ft. in fair to good sedimentary rock formation. With mud, capacity is over 1,000 ft., using a 9-inch bit. Maximum hole size is 20-inch diameter. Rig weight is approximately 22,000 lbs.

For complete Type 8 specifications, write **Davey Compressor Co.**, Kent, Ohio. Ask for Bulletin E-270.

● A new quality cutter bit of full radius design is announced by Austin Powder Company, Cleveland 13, Ohio.

Listed as type AP-10R, it can be used on auger boring machines, continuous miners and short wall cutting equipment. Depending on job requirements, it is furnished with carbide tip at either 15° or 7½° positive rake angle in 1½" or 1¾" gauge alloy steel shank with or without a hole for pin.



Austin AP-10R cutter bit

In addition to the AP-10R, Austin also produces end mill and plug type cutter bits. Each are said to provide maximum service life through virtual elimination of tip loss and shank breakage even under the most sever cutting conditions.

For further detail, request form 777, Austin Powder Company, Cleveland 13, Ohio.

● G. E. Sorensen, president of The Kemmerer Coal Co. and Gunn-Quealy Coal Co., of Frontier, Wyo., was elected president of the Utah-Wyoming Coal Operators Association.

Directors, in addition to Messrs. Sorensen, Cornelius, and Kennedy, are W. J. O'Connor, president, Independent Coal & Coke Co.; W. W. Clyde, president, Knight Ideal Coal Co.; A. B. Foulier, vice president, Lion Coal Corp.; Earl J. Evans, treasurer and assistant secretary, Spring Canyon and Royal Coal Companies, and H. J. Schultz, manager, Western Coal Mining Co.

T. J. Canavan was reappointed executive secretary and treasurer, and D. A. James, vice president of Liberty Fuel Co., was reappointed assistant treasurer. Mrs. Clara Outsen was reappointed assistant secretary.

● The day of the automated coal mine is coming closer, spurred on by the great increases in productivity possible with electronic controls and communication, including television.

So says Earl A. Berry, electronics engineer for Mine Safety Appliances Company, Pittsburgh. Mr. Berry made his prediction before the coal mining session of the Western Pennsylvania Safety Engineering Conference held in Pittsburgh, April 14-16.

"The day is fast approaching," Mr. Berry said, "when mining men will consider electronic systems as carefully and plan them as well as they now plan their power, transportation, and mining systems."

He reported that one large western metal mine was able to increase its tonnage by 4,000 tons a day by installing "push-button" electronic communication systems.

The MSA engineer said that the mining industry was particularly suited for electronic controls because "the chief problem is one of materials handling, employing a very wide and diversified field of highly specialized equipment, scattered over a relatively large area."

Reporting that a large number of electronic instruments and devices were already available, Mr. Berry said that "all that is required is to put these components together into systems."

Such systems, he added, can be applied to both on-the-spot and remote control. They can be used to control temperature and pressure to detect gases and fires; and to start, stop, speed-up, or slow-down machinery. From a remote position, they can be used to control over-all activity by means of push-buttons, television, communication systems, and telemetry.

JOY UPS R. T. HAIR IN COAL MACHINERY DIVISION REORGANIZATION

L. D. Gent and R. M. Hippard also Promoted

R. T. HAIR

L. D. GENT

R. M. HIPPARD

● R. T. Hair has been appointed general sales manager, Coal Machinery Division, Joy Manufacturing Company, in a reorganization move that further strengthens and streamlines the division's coverage of industries mining coal and nonmetallic bedded deposits. He will continue to maintain his office at the company's executive headquarters in Pittsburgh, Pa. Prior to his new appointment, Mr. Hair was sales manager of the division.

Lawrence D. Gent, former manager of the Pittsburgh district sales office, has been appointed sales manager, coal industry, with headquarters at the Pittsburgh executive office. Ralph M. Hippard succeeds Mr. Gent as Pitsburgh district manager.

Mr. Hair has been with Joy in various engineering, sales and service positions since 1943, including those of general service manager and product manager, miners and loaders. He made important contributions to the development of the shuttle car, timber setter and other mining machines, and holds several patents on such machinery.

Stripping overburden from an underlying vein of soft coal is a Model 3600 Manitowoc shovel owned by Hawk Brothers Contracting Co., New Bethlehem, Penna. This particular formation at Timelin, Penna., is mostly solid rock and very difficult to handle.

Mr. Gent has held various sales and service positions with Joy since 1943. He is a native of Pittsburgh, Pa., and a graduate of Franklin High School, Franklin, Pa., and of Pennsylvania State University, with a B. S. degree in Mining Engineering. He served in the C-B-I Theater during World War II as a first lieutenant in the Engineer Corps. Following this, he returned to Joy as office manager of the Huntington sales office, later returning to field sales. In 1954, he was transferred to the company's Pittsburgh sales district as assistant district manager, and became district manager there in 1955. Mr. Gent is a member of A.I.M.M.E., West Virginia Mining Inst., and the Mt. Lebanon Country Club.

Mr. Hippard, a native of Coulterville, Ill., is a veteran of 23 years with Joy. Joining the company in 1936, he held positions as serviceman and equipment salesman until 1952, when he became assistant manager of the company's Huntington district. In 1958, he was appointed assistant district manager, St. Louis, from which he is moving to his position. A graduate of schools in Belleville, Ill., Mr. Hippard served as a primary flight instructor with the Army Air Force from 1942 to 1944. He is a member of the Kentucky Mining Inst., the Cumberland Gap Area Development Assn., and the Middlesboro (Ky.) Country Club.

THE STORY BEHIND A FAMOUS PROMISE

We have often published this statement: J. T. FISH is always ready to buy, sell, or trade.

We are able to live up to this pledge because we operate a diversified large volume business in mining equipment on a small margin of profit.

Just as we guarantee an unfailing source of supply to our customers, we guarantee a year-round market for your rails, wire, equipment or complete mines, at fair prices regardless of seasonal fluctuations.

WE OWN WHAT WE ADVERTISE!!!

JOY EQUIPMENT—REBUILT

3—Joy 14-BU Loaders, low pedestal, 7AE
2—Joy 14BU Loaders, medium pedestal, 7RBE.
1—Joy 14-BU Loader, high pedestal, 7CE.
6—12BU10E Joy Loaders complete with Piggy Backs.
2—Joy 12BU Loaders, 9E, latest type.
1—Joy 20BU Loader, latest type.
1—Joy 11BU Loader, latest type.
2—Joy 8BU Loaders, 250 volt DC.
1—Joy 8BU Loader, 34" overall height.
2—Joy 8BU Loaders, 220 volt AC.
1—Joy curved Bar Head, complete.
6—Reliance 24-J Motors, 7½ H.P.
4—Reliance 10-J Motors, 5 H.P.
20—9-J Motors, 4 H.P.
1—Goodman 660 Loader on cats, excellent.
1—Goodman 665 Loader on cats, latest type.
1—Goodman 865 Loader, 26" high.
2—Joy 6SC Shuttle Cars, rebuilt.
3—Joy 6SC Shuttle Cars, latest type.
2—Joy 5SC Shuttle Cars, rebuilt.
2—Joy 32E9 Shuttle Cars.
2—Joy 32E10 Shuttle Cars, rebuilt.
2—Joy 32E15 Shuttle Cars, rebuilt.
4—Joy 32E16 Shuttle Cars, rebuilt.
2—Joy 42E16 Shuttle Cars, rebuilt.
2—Joy 42E18 Shuttle Cars.
8—Small rubber tired Shuttle Cars.
3—Low Vein Rubber Tired Tractors.
3—Joy CD-22 Drill, like new.
10—Joy T-2-5 low pan Cat Trucks.
1—Joy T-2-6 low pan Cat Truck with reel.
2—Joy T-1 Standard Cat Trucks, 220 AC.
1—Joy T-1 Standard Cat Truck, 250 DC.
2—Goodman low pan Cat Trucks, like new, latest type.
4—Joy 11-B Cutting Machines, like new, 35 and 50 H.P.
1—Joy 7-B Cutting Machine, like new, 250 volt DC.
2—Goodman 212 Cutting Machines, 19" high.
4—Goodman 312 Cutting Machines, 17" high.
3—Goodman 412 Cutting Machines, 19" high.
2—Joy 7-B Cutting Machines, 220/440 volt AC.
1—Goodman Machine on Cats, 31" high. All hydraulic.
6—Goodman 512 Machines with Bugdusters.
1—Goodman 512 Cutting Machine, perfect.
1—Lee Norse low vein Machine Carrier on rubber.
1—Jeffrey 70 URB rubber tired Cutter. Universal head, perfect condition.
1—Joy 11RU Rubber Tired Cutters with bug-dusters, Universal head, like new.
2—Jeffrey 29UC Cutting Machines, Universal head, cuts anywhere in seam, 38" high, on cats, 250 volt DC.

LOCOMOTIVES

1—Goodman 6 ton, 91-A, 27" high, armor plate frame
2—Jeffrey 13 ton, type MH-110, 36", 42" and 44" Ga.
2—Jeffrey, 10 ton, type MH-110, 42" and 44" Ga.
2—Goodman 8-30 and 10-30 Locomotives, 26" above rail.
1—Jeffrey MH-124, 6 ton, 24" overall height.
12—Jeffrey, 6 ton, type MH-88, 42", 44" and 48" Ga.
4—Jeffrey, 8 ton, type MH-100, 2½" armor plate frames.
1—Jeffrey, 6 ton, type 2186, 22" above rail.
3—Jeffrey, 4 ton, type MH-96, 42", 44" and 48" Ga.
1—G. E., 4 ton, type 825 Locomotive, 22" high.
10—G.E., 6 ton, types 801, 803, 821 Locomotives, 42", 44" and 48" Ga.
1—G.E. 8 ton, type 822 Locomotive, 44" Ga.
3—G.E. 10 ton, type 809 Locomotives, 42", 44" 48" Ga.
2—Goodman, type 33, 6 ton, 44" and 48" Ga.
3—Goodman, 8 ton, type 32A, 36", 44" and 48" Ga.
3—Westinghouse, type 902, 4 ton, 42" and 48" Ga.
2—Westinghouse, type 904, 6 ton, 44" and 48" Ga.
2—Westinghouse, type 906, 44" and 48" Ga.
2—Westinghouse, type 907, 10 ton, 44" and 48" Ga.
8—Jeffrey MH-78 Locomotive Units, cheap.
4—Jeffrey MH-88 Locomotive Units, real bargains.

Locomotives (Cont.)

6—Jeffrey MH-100 Locomotive Units, reasonable.
Locomotive Trucks and Spare Armatures for all the above.
3—Plymouth Diesel Locomotives, 8 and 10 tons, 42" and 44" Ga.

TIPPLE EQUIPMENT

5—Complete Tipples, 3 to 5 track, steel and wood.
3—Cleaning Plants, 1 Ea. McNally, Roberts and Schaefer, Jeffrey, Washers and Airflo Tables.
4—complete Aerial Trams for coal or refuse.
3—complete Rope and Button Lines.
2—Monitor Lines complete with Drums, excellent.
1—Allis Chalmers 5x12 Low-Head Vibrator.
2—Allis Chalmers 5x14 Rippflo Vibrators.
2—Robins 5x14 double deck Vibrators
1—Robins Gyrex Vibrator 4x10.
10—Belt and Apron type Loading Booms.
6—Shaker Screens
1—Robins Car Shakeout.
20—Crushers, various sizes.
Feeders, Belt and Drag Conveyors, Car Retarders, etc.

CUTTING MACHINES

1—Joy 11RU's, rubber tired, Cutter.
1—Jeffrey 70 URB Cutter, rubber tired, Universal Head, low vein.
2—Jeffrey 29UC Universal Machines on Cats.
1—Goodman on cats, 31" overall height.
3—Baby Goodman 212's, rebuilt, 250 Volt DC.
2—Goodman 212 Cutting Machines, 19" high.
4—Goodman 312 Cutting Machines, 17" high.
3—Goodman 412 Cutting Machines, 19" high.
6—Goodman 512's with Bugdusters, like new.
4—Goodman 512's, rebuilt, or as removed from service.
3—Goodman 112's 220/440 volt AC.
2—Joy 7-B Cutting Machines, 220/440 volt AC
1—Joy 7-B Cutting Machine, 250 volt DC.
4—Joy 11B Cutting Machines, rebuilt. 35 and 50 H. P.
10—Goodman 12AA's and 112AA's, 250 volt DC.
2—Goodman 324 Slabbers.
2—Goodman 724 Slabbers.
6—Jeffrey 35L's, like new, 17" high.
2—Jeffrey 35L's on low vein trucks.
15—Jeffrey 35B's and 35BB's.
2—Jeffrey 29B's on track.
2—Jeffrey 29C's, track mounted.
2—Jeffrey 29L's on track, perfect.
2—Jeffrey 29L's on cats—Excellent.
3—Sullivan CE7, 220 volt AC.
6—Sullivan 7AU Cutters see track.

LOADING MACHINES

6—Joy 12BU with Piggy-Back Conveyors
16—Joy Loaders, 8BU, 11BU, 12BU, 14BU, 20BU.
1—Goodman 865 Loader, 26", on cats.
1—Goodman 665 Loader, on cats.
1—Goodman 660 Loader, on cats.
1—Goodman 460, rebuilt. On track.
2—Jeffrey 61 CLR's, on rubber, 26".
3—Jeffrey L-500 Loaders.
6—Myers Whaley No. 3 Automatic Loaders.
2—Clarkson Loaders, 26" above rail.

CONVEYORS

2—Joy 30" Underground Belt Conveyors, 500' to 2000' each. Excellent.
2—Goodman 97-C. 30" Conveyors. 1500' long.
3—Robins 30" Belt Conveyors, 200' to 2000'.
4—Jeffrey 52-B, 30" Drive and Tail Assemblies, complete.
2—Joy MTB 30" Drive and Tail Assembly, complete.
3—Goodman 97 HC 30" Drive and Tail Assemblies, complete.
8,000' Conveyor Belt, 30".
10,000' Conveyor Belt, 26", like new.
8—Jeffrey 61AM 12" Chain Conveyors, 300'.
2—61EW Elevating Conveyors.
2—61WH 15" Room Conveyors, 300'.
2—Joy 15" Room Conveyors, 300'.
2—Joy 20" Conveyors, 300'.
4—Joy Ladel UN-17 Shakers.
10—Goodman G-12½ and G-15 Shakers.
1—300KW Portable Rectifier excellent
2—100KW, G.E. TCC-6's, 275 volt, Rotary Converters

CONVERTERS AND DIESEL PLANTS

1—150KW, G.E. HCC-6, 275 volt, Rotary Converter.
1—150KW, 6 phase, Allis Chalmers Rotary Converter, 275 DC.
1—200KW Allis Chalmers Rotary Converter, 6 phase, 275 DC, perfect.
1—200 KW, G.E. HCC-6 Rotary Converter, 275 volt DC. Newly rewound.
1—300KW, G. E. HCC-6 Rotary Converter, 275 DC.
2—300KW Westinghouse, 6 phase, Rotary Converters, 275 volt DC.
2—500KW Westinghouse Rotary Converters, 275 volt DC.
2—200KW Westinghouse Rotary Converters, 275 DC. Newly rewound. (all the above with 6900/13000 and/or 2300/4000 primary transformers)
2—150KW MG Sets, General Electric and Westinghouse.
1—200KW MG Set, Westinghouse, rebuilt.
1—200KW MG Set, General Electric, perfect.
2—150KW Allis Chalmers MG Sets, 275 DC volt, excellent 220-440 AC volt.
1—300KW Westinghouse, 600 volt MG Set, rebuilt.
2—300 KW Westinghouse, 600 volt, 6 phase, Rotary Converters.
2—500KW Westinghouse, 600 volt, DC, 6 phase, Rotary Converters.
2—500KW HCC-6 Rotary Converters, 6 Phase, 600 volt DC.
1—GMC 471 Diesel with 60 KW, 250 volt DC Generator.
1—GMC-671 Diesel with 75 KW, 250 volt DC Generator.
1—GMC-671 Diesel with 110KW, 250 volt DC Generator.
1—Cummins 125 KW, Diesel with 250 volt DC Generator.
1—Allis Chalmers Natural Gas Engine with 100 KW Generator, 275 volt DC.
Boilers, like new, 500 H.P.

MISCELLANEOUS

5—Complete Tipples, 3 to 5 Track. Wood and Steel.
20—Jeffrey Molveyors on rubber tires.
1—¾ Yard Shovel and Back-Hoe.
1—¾ Yard Crane on Cats.
Battery Supply Tractors, rubber tired.
1—Cantrell Air Compressor on rubber tires.
10—Air Compressors, 1 H.P. to 40 H.P.
2—Joy self propelled rubber tired compressors, 240 cu. ft.
2—Acme self propelled rubber tired compressors, 130 cu. ft.
40 Mine Pumps, all types.
1—Differential 40 Passenger Man Trip Car.
6—MSA Rock Dusters.
2—Phillips, Carriers, 44" and 48" Ga.
1—Barber Greene self propelled Bucket Elevator.
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30 Mine Cars, drop bottom, 44" Ga.
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300 Mine Cars, end dump and drop bottom, 20" high, 48" Ga.
1—10 ton Mine Car Scale with Recorder.
15—Brown Fayro HKL and HG Car Spotters.
1—12 ton Differential Slate Larry.
Incline Hoists, 25 to 50 H.P.
1—Jeffrey 5' Aerodyne Fan, like new.
1—Jeffrey 6' Aerodyne Fan.
1—Jeffrey 8' Aerodyne Fan.
2—Storage Tanks, 4,000 Gallons.
1—Storage Tank, 10,000 Gallons.
10,000 Five Gallon G. I. Cans, screw lids.
2500 tons Relaying Rail, 25, 30, 40, 50, 60, 70, 80 #.
100 tons Copper — 4/0 and 9 Section Trolley 1/0, 2/0, 4/0 Stranded. 500 MCM and 1,000 MCM Feeder Cable.
Thousands of feet of rubber covered three conductor cable. All sizes.
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1— Fricke Saw Mill—Complete.

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200-W Bucyrus-Erie Diesel Drag, 125', 6 yd.
5-W Bucyrus-Erie Diesel Drag, 100', 6 yd.
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4500 Manitowoc Drag, 120', 5 yd.
120-B Bucyrus-Erie Elec. Drag, 115', 5 yd.
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5480 Marion 18 yd. Elec. H. L. Shovel
151-M Marion 7 yd. Elec. Shovel
170-B Bucyrus-Erie 6½ yd. Elec. Shovel
4161 Marion 6 yd. Elec. Shovel
2400 Lima 4½ yd. H. L. Shovel
120-B Bucyrus-Erie 4 yd. Elec. Shovel
4500 Manitowoc 5 yd. H. L. Shovel
111-M Marion Standard & H. L. Shovels
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Large selection of smaller Shovels and Draglines available
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1–48" Wide x 963' Long Link Belt Overland Belt Conveyor

w/100 h.p. Drive, mounted on 6" channel, in 18' sections, bolted construction, 6" Carrying and Return Rollers w/grease type bearings complete w/Manhattan Master Belting, 8 ply, ¼" top cover, 3/32" bottom cover. Excellent condition. Photos available on request.

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Made to Withstand High Drilling Speed Whip And Torsional Strain Of Electric Drills.

Drills holes faster — Will not snap off shank or chip points — Outlasts four or five ordinary augers

THE SALEM TOOL COMPANY EDgewood 7-3416 SALEM, OHIO, U.S.A.

● A long step forward in the automatic control of machines was seen in development of a method for preparing the necessary instructions with an electronic computer can calculate the numerical for Automatically programmed Tool, can increase the productive capacity of all U. S. industries. Using it, a high-speed digital computer can caluculate the numerical information necessary to determine the motions an automatically controlled machine must make in cutting metal parts for aircraft, missiles or other products.

Key to the system is a relatively simple, English-like language with which a human operator can communicate descriptions of the required parts and how they should be cut directly to the giant computer.

The language, designed primarily for convenience of humans, can be translated and understood by the computer. It permits those with no knowledge of computers to control complex calculations and is placed in the computer's "memory" by way of punched cards.

Numerical control for automatic machine tools has now been adopted by many plants throughout the country, but a bottleneck developed in preparing instructions for such tools. APT is a solution to this problem.

The system allows a designer to conceive a part, turn over his rough sketches to a draftsman who makes a detailed drawing. An outline of the general machining sequence to be followed by the cutting tool is then made by a programmer in the APT language. When fed into a computer with APT instructions in its "memory," the directions are transformed into the numerous detailed instructions required to produce the part.

The APT system was developed at the Massachusetts Institute of Technology Servomechanisms Laboratory sponsored by the Air Forces Air Materiel Command.

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When you need parts for your Bucyrus-Erie, you'll get genuine Bucyrus-Erie parts built to original equipment specifications—no "will fit" parts that could rob you of time and money on *any* contract.

Our modern parts and service department has the tools and equipment to do the job. Both are designed to give you *fast* service when the chips are down.

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Boron Coal Co. boosts production with Allis-Chalmers HD-21s

At Lecontes Mills, Boron Coal Co. uses Allis-Chalmers HD-21s for every heavy duty mine task . . . no job is too tough!

Like other leading operators, Boron relies on equipment from Highway to keep costs below estimated limits . . . to beat production schedules . . . and to earn greater profits!

A-281A

HD-21s strip, fill, build access roads and clear paths for draglines.

Poised for a big cut . . .

Highway

HIGHWAY EQUIPMENT COMPANY
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